WHAT IS CLAIMED IS:

1. A nano-structured synthetic implant, comprising a polymeric material having sub-micron sized or nano-sized surface features.

2. The implant of claim 1 wherein the surface features have one or more dimensions in the range from about 50 nm to less than about 1 $\mu$m.

3. The implant of claim 1 wherein the surface features are sub-micron surface features having at least one dimension in the range from about 100 nm to less than about 1 $\mu$m.

4. The implant of claim 1 wherein the surface features are nano-sized surface features having at least one dimension in the range from about 50 nm to about 100 nm.

5. The implant of claim 1 wherein the surface features are nano-sized surface features having at least one dimension in the range from about 25 nm to about 50 nm.

6. The implant of claim 1 wherein the polymer has a surface roughness of about 50 nm or greater.

7. The implant of claim 1 wherein the polymer has a surface roughness of about 100 nm or greater.

8. The implant of claim 1 wherein the polymer has a surface area of greater than about 30 $\mu m^2$ per 25 $\mu m^2$.

9. The implant of claim 1 wherein the polymeric material is a polymeric film.

10. The implant of claim 1 wherein the polymeric material is a biodegradable polymer.

11. The implant of claim 1 wherein the polymeric material comprises a compound selected from the group consisting of poly(lactic acid-glycolic acid), poly(ether-urethane), and polycaprolactone.

12. The implant of claim 1 wherein the polymeric material comprises a polymeric film of poly(lactic-glycolic acid).

13. The implant of claim 1 further comprising an extracellular matrix component.

14. The implant of claim 13 wherein the extracellular matrix component is an extracellular matrix component of bladder smooth muscle cells.

15. The implant of claim 13 wherein the extracellular matrix component is selected from the group consisting of proteins, growth factors, and cytokines.

16. The implant of claim 13 wherein the extracellular matrix component is a protein selected from the group consisting of collagens, laminin, fibronectin, elastin, elastin-associated microfibrillar proteins, proteoglycans, and arginine-glycine-aspartic acid peptides.

17. The implant of claim 16 wherein the protein is collagen IV.

18. The implant of claim 1 further comprising a population of cells, said population of cells seeded on the polymer surface.

19. The implant of claim 18 wherein the cells are selected from the group consisting of smooth muscles cells, fibroblasts, urothelial cells, neutrophils, monocytes, fibroblasts, and macrophages.

20. The implant of claim 18 wherein the cells are selected from the group consisting of smooth muscles cells, fibroblasts, and urothelial cells.

21. A nano-structured polymeric material having nano-sized surface features, said polymer formed from a process comprising a step selected from the group consisting of:

(i) placing a solution of a polymer in a mold, said mold including a molding surface having an imprint of a nano-structured surface thereon, and curing the polymer; and

(ii) treating a polymer having a surface with a reagent in an amount and for a time effective to modify the surface of the polymer, said modification including the formation of nano-sized structures on the surface of the polymer.

22. A nano-structured surface comprising a polymeric material having sub-micron sized or nano-sized surface features.

23. The surface of claim 22 wherein the surface features are nano-sized surface features having at least one dimension in the range from about 50 nm to about 100 nm.

24. The surface of claim 22 wherein the surface features are nano-sized surface features having at least one dimension in the range from about 25 nm to about 50 nm.

25. A process for preparing a nano-structured polymeric surface, comprising the step of:

treating a polymeric material having a surface with a reagent in an amount and for a time effective to modify the surface of the polymeric material, said modification including the formation of nano-sized structures on the surface of the polymeric material.

26. The process of claim 23 wherein the treating step includes treating a polymeric matrerial with a reagent selected from the group consisting of acids and bases.

27. The process of claim 23 wherein the treating step includes treating a polymeric material with a reagent selected from the group consisting of HCl, $H_2SO_4$, $HNO_3$, $HClO_4$, $H_3PO_4$, HF, NaOH, $K_2CO_3$, and $NaHCO_3$.

28. The process of claim 23 wherein the treating step includes treating a polymeric material with a reagent selected from the group consisting of $HNO_3$ and NaOH.

29. A process for preparing a nano-structured polymeric surface, comprising:

(a) placing a solution of a polymer in a mold, said mold including a molding surface having an imprint of a nano-structured surface thereon; and

(b) curing the polymer to form a polymeric material having a nano-structured polymeric surface.

30. A method for treating a patient in need of relief from a bladder injury comprising the step of introducing into the patient a nano-structured synthetic bladder implant comprising a polymeric material having sub-micron sized or nano-sized surface features.

31. The process of claim 30 wherein the introducing step includes introducing a biodegradable synthetic bladder implant.

32. The process of claim 30 wherein the introducing step includes introducing a synthetic bladder implant comprising poly(lactic-glycolic acid).